

Price-Increasing Competition:

The Curious Case of Overdraft v. Deferred Deposit Credit

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August 7, 2009

Abstract

We study the small dollar loan market and find, surprisingly, that competition from deferred deposit (“payday”) lenders increases the price of overdraft credit provided by mainstream depository institutions. We attribute this finding, in part, to adverse selection created by the flat fee (“buffet style”) pricing of overdraft credit, pricing that favors depositors who overdraw in larger amounts. Entering deferred deposit lenders charging *ala-carte* (*per* \$ borrowed) attract customers prone to small overdrafts and saddle depositories with proportionately more of the opposite type. Depositors prone to large overdrafts borrow more, and when they default, banks lose more, so costs and prices rise. Consistent with this adverse selection hypothesis, we document that the average dollar amount *per* returned check processed by the Federal Reserve increases when deferred deposit credit is available. Beyond documenting another case of price-increasing competition, our findings bear on theories of adverse selection in credit markets and contribute to the debate over the pros and cons of deferred deposit credit.

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I. Introduction

Competition does not always decrease prices. Chen and Riordan (2008) show that competition between two differentiated products can increase each product's price in "non-exceptional" theoretical circumstances and cite evidence of price-increasing competition in two markets, food and drugs.² Our paper finds price-increasing competition in a third market, this time for consumer credit.

The small-dollar consumer loan market we study pits two very different competitors against one another. On the one side are mainstream banks and credit unions that supply overdraft credit whenever they cover check, ATM, or debit card transactions that would have overdrawn depositors' account otherwise. On the other side are much smaller deferred deposit (payday) lenders who hold customers' personal checks for about two weeks (until payday), providing the check-writer with \$50 to \$500 of cash-credit in the interim. An estimated 19 million households demanded payday loans from roughly 24,000 deferred deposit lenders in 2006 (Stevens Inc. 2008).

Although priced differently, overdraft and deferred deposit credit are partial substitutes. Perhaps to avoid regulatory scrutiny, mainstream intermediaries charged a fixed fee per overdraft regardless of the size of overdraft. The median price in 2006 was \$27 per overdraft (FDIC 2008). By contrast, deferred deposit credit is priced *per unit* with a typical fee of \$15 *per* \$100. Although payday lenders are often maligned for their high prices, deferred deposit is cheaper than overdraft credit for sufficiently small overdrafts.³

² Perloff, Suslow, and Seguin 2005; Ward et al. 2002; Thomadsen 2005

³ At \$27, two-week overdraft credit costs more than a deferred deposit loan for amounts of \$180 or less. Sheila Bair (2005), now head of the Federal Deposit Insurance Corp., observed that depositories earned "enormous" fees on overdraft protection and that customers were turning to deferred deposit credit for their "cheaper product."

Our paper investigates how the price of overdraft credit and the supply of “free” checking accounts change when deferred deposit credit is available. Both outcomes are observed at the institution-county level using a nationally representative survey of banks and credit unions.

We identify plausibly exogenous variation in the availability of deferred deposit credit using two different schemes. The first, following Morgan and Strain (2008), uses changes in deferred deposit laws over time within states to estimate difference-in-difference regressions. The second, following Melzer (2009), focuses on institutions in states that prohibit deferred deposit, and uses differences in the distance to the nearest deferred deposit-allowing state. The first scheme compares how outcomes changes as states switch from allowing to prohibiting deferred deposit credit, or vice versa. The second scheme compares outcomes at institutions located in counties near the border of states that allow deferred deposit credit with outcomes at institutions located in counties further from the border. The identifying assumption for the first scheme is that legal changes within states are independent of overdraft outcomes, a plausible, if arguable, assumption. The identifying assumptions for the second scheme are that the deferred deposit laws and location of intermediaries in one state are independent of laws in neighboring states, a less arguable assumption it strikes us.

To our initial surprise, we find that access to deferred deposit credit increases the price of overdraft credit increase and reduces the availability of “free” checking accounts. The changes are meaningful; the price of overdraft credit increases by \$1, or 4 percent, and the likelihood of free checking falls by 5 percent.

How do we explain price-increasing competition? One might wonder if we are confusing cause and effect; perhaps rising overdraft prices within a state (endogenously) motivate legislators to permit deferred deposit credit. However, our second identification is not subject to

that objection; it seems implausible that the regulatory decisions in one state are driven by the overdraft conditions in counties in neighboring states, and, at that, only by those counties within 10 miles of the border, as we find.

Could it be that access to deferred deposit credit increases *demand* for overdraft credit? That prediction follows from the “debt trap” hypothesis against deferred deposit credit, the proposition that the prohibitively high rates charged by deferred deposit lenders aggravates their borrowers already strained financial condition and drives them to demand still more credit, including, perhaps, overdraft credit.⁴ However, Morgan and Strain (2008) document that returned checks rates fall when deferred deposit credit is available. That finding, which we confirm and extend here, suggests access to deferred deposit credit *reduces* demand for overdraft credit, at least by some account holders.

More positively, our findings could reflect the theoretical counter-effects of competition predicted by Chen and Riordan (2008). Analyzing a monopoly-duopoly model where consumers make discrete choices between differentiated products, they show that the customary downward pressure on prices from entry (as firms “defend” lost market share) may be offset by upward pressure when the duopolist’s remaining customers are less price-elastic.

In addition to the sorting effects predicted by Chen and Riordan (2008), we argue that the price-increasing competition we find is partly due to the curious flat-fee pricing of overdraft credit. According to the FDIC 2008 (Table IV.2 p. 14), 98.4 percent of depository institutions charge *per* overdraft. Less than one percent charges a rate that varies with the length of the overdraft, i.e. “*per* daily occurrence.” White (2007) contends that banks eschew explicit interest

⁴ Melzer (2009) finds that households with geographic access to payday loan stores are more likely to report difficulty paying bills, and Skiba and Tobacman (2008) find higher rates of Chapter 13 bankruptcy filings among payday borrowers.

to avoid regulation as credit and hence, usury limits.⁵ Banks may also want to avoid the adverse publicity that quadruple digit interest rates might incite. Bair (2005) notes the attitude of some bank officials toward deferred deposit loans: “most bank officials we interviewed perceived the product as too high risk to offer profitably except at extremely high interest rates, thus inviting criticism from media, public policy officials, and consumer advocates.”

Flat fee, “buffet-style” pricing obviously disadvantages depositors that overdraw in small amounts, and so exposes overdraft providers to adverse selection. Granted access to deferred deposit credit, depositors prone to smaller overdrafts switch, saddling banks and credit unions with proportionately more depositors who overdraw in large amounts. That adverse selection increases costs to overdraft providers in two ways; customers who overdraw in large amounts cost more to fund, and when they default, lenders lose more.⁶ The higher costs of providing overdraft lead to higher prices.

The adverse selection hypothesis implies average overdraft amounts should increase when deferred deposit credit is available, a prediction we test using returned check rates at Federal Reserve check processing centers. After confirming that returned check rates fall when deferred deposit credit is available, we document that the average amount *per* returned check increases, consistent with the adverse selection hypothesis.

Three auxiliary findings help resolve the main findings. First, we find that that the decline in the availability of “free” checking accounts associated with access to deferred deposit credit is significant only for deposits *without* direct deposit. That looks (to us) like risk management;

⁵ When threatened with usury limits, counsel for banks have argued that “... the fee is flat, not related to the time the loan is outstanding or to the principal balance of the loan” and therefore, not interest (White p. 198).

⁶ Even without assuming higher proportional loss rates on large-dollar overdrafts, the dollar credit losses on the marginal overdraft are likely to increase as the dollar amount of the marginal overdraft increases. In this case, prices rise due to increases in marginal cost rather than due to higher mark-ups.

anticipating that customers demanding “free” checking without direct deposit may be anticipating large, unpaid overdrafts, depositories limit supply of free checking without direct deposit.⁷

Second, credit unions and banks respond differently to competition from deferred deposit lenders. In general, credit unions charge less for overdrafts than banks and are more likely to supply “free” checking, particularly for accounts without direct deposit. While those overall differences seem consistent with credit unions’ non-profit charter, they might also indicate that credit union depositors are especially price-sensitive; depositors are possibly selecting credit unions particularly for the lower prices. Consistent with the second view, we find that the gap between overdraft fees at banks and credit unions narrows when deferred deposit loans are available, suggesting that credit unions are more exposed to adverse selection because their depositors are more price elastic.⁸

Lastly, the response of overdraft prices to competition from deferred deposit lenders depends on deposit market concentration, and vice-versa. In more concentrated deposit markets, entry by deferred deposit is associated with lower overdraft fees, consistent with textbook theory. Conversely, the impact of increasing deposit market concentration on fees is much smaller when deferred deposit credit is available. Deferred deposit lenders appear to contest increasing deposit market concentration, thereby shielding consumers from higher fees that might prevail in their absence.

⁷ The credit model in Riordan (1993) predicts competition in banking *per se* can increase risk and lead banks to tighten underwriting for two reasons. First, competition may degrade the quality of information banks use to screen borrowers, so more bad loans are made. Second, concerns about the winners’ curse—the fact that banks may overbid (underprice) credit—will lead them to tighten underwriting standards.

⁸ If the adverse selection is worse for credit unions, it might explain the political friction between them and deferred deposit lenders. See Morgan and Strain (2008).

Our study contributes on several fronts, not least by providing a third instance of price-increasing competition. We also illuminate competition and pricing frictions in a large, yet largely unstudied, consumer loan market and our findings may resolve apparent contradictions in the extant literature. Campbell, Jerez-Martinez, and Tufano (2008) find that involuntary checking account closures *per capita* (due to excessive overdrafts) rise. How can we observe depositors bouncing fewer checks (Morgan and Strain 2008), yet more households “bouncing out” of the banking system? Our finding that banks reduce the availability of “free” checking without direct deposit suggests they tighten underwriting standards when deferred deposit credit is available.⁹

The interactions between overdraft providers and deferred deposit lenders may be a case where a competing class of firms *does* educate (“debias”) myopic consumers about the hidden fees (“shrouded attributes”) associated with another firms’ product, an issue Gabaix and Laibson (2006) study.¹⁰ Their main point is that debiasing may not be profitable because debiased consumers will simply avoid the shrouded attributes without switching to competitors; newly sophisticated consumers who know to avoid shrouded attributes will be subsidized by the remaining myopic consumers.¹¹ While other banks might not be motivated to unshroud the attributes of deposits, deferred deposit providers might. On that point, it is interesting to note

⁹ Pinho de Mello (2005) finds that price reductions are associated with increases in default rates on Brazilian consumer overdraft loans. He argues that informational asymmetries and adverse selection explain this result, positing that riskier customers are more price sensitive, as in Ausubel (1991). Information asymmetries may also hamper the overdraft market we study, but they are not necessary to explain our findings. The structure of the overdraft market in Brazil differs from that of the United States; Brazilian overdraft loans are lines of credit with interest charges determined as a percentage of the amount borrowed.

¹⁰ Indeed, they use “free” bank accounts and overdraft fees as leading examples of shrouded attributes. See footnote 22 in Gabaix and Laibson (2006).

¹¹ Fusaro (2009) notes that depositors earning over \$60,000 *per year* had the lowest overdraft APR of any group analyzed, a striking fact, he suggests, given the absence of correlation between income and the number of overdrafts. He concludes high income depositors are not less likely to overdraft, but are better at getting “less unfavorable” rates.

how aggressively deferred deposit lenders have publicized the results of the FDIC (2008) study of the costs and usage of overdraft protection.¹²

Section II compares overdraft and deferred deposit credit and makes the case, based on prices and usage patterns, that they are at least partial substitutes. Section III describes the exit and entry of deferred deposit lenders that constitute the “experiments” we use to study overdraft and deposit outcomes. Section IV presents the main result—price-increasing competition---revealed by those experiments. Section V presents auxiliary findings suggesting adverse selection created by crudely (flat) priced overdraft is partly responsible the price-increasing competition we find. Section VI concludes by discussing implications for consumer welfare, policy, and future research.

II. Overdraft Protection and Deferred Deposit Credit

This section describes the two main players in the small-dollar loan market and compares the pricing and usage of their services. The key points to take away are that overdraft and deferred deposit credit are partial substitutes, and that deferred deposit credit may be cheaper for small-dollar overdrafts. Both providers depend on revenues from repeat borrowing by core customers.

II.1 Overdraft Protection

Sometime in the 1990s financial advisory firms began marketing trade-marked, computer algorithms designed to automate and optimize depository institutions’ (DI) traditionally *ad hoc* overdraft decisions.¹³ Fusaro’s (2009) study of adoption rates finds that the hazard rate of adoption increases with bank market concentration, contrary to what theory predicts and other

¹² For example: http://www.approvedcashadvance.com/images/highlights_fdic_bank_overdraft_programs.pdf

¹³ In a testimonial on the website of Strunk and Associates, purveyor of “Overdraft Privilege, a banker recalls “... I believe ...we were the first institution in Georgia to implement the service. That was in 1998 or 1999” <http://www.strunklp.com/custom.asp?id=128274&page=13>. Accessed March 30, 2009.

technology adoption studies tend to find. He finds some evidence “epidemic” effects, where the probability of adoption by individual institutions increases with aggregate adoption rates, and some of his estimates indicate that “urban” banks, all else the same, are more likely adopters. The FDIC’s (Federal Deposit Insurance Corporation) recent landmark study of bank overdraft programs reveals how ubiquitous overdraft protection programs have now become (FDIC 2008).¹⁴ Forty percent of all banks surveyed operated automated overdraft programs. Over three-fourths of large banks (asset > \$ 5 billion) had automated OD of one sort or another. The study shows that DI offer a full “suite” of overdraft protection, ranging from lines of credit (LOC), arguably the top-of-the line, to automated discretionary overdraft protection (OD), more familiarly known as bounce “protection,” the variety we study.¹⁵

Depending on the amount of the overdraft, overdraft credit can be more expensive than deferred deposit credit. The median NSF (insufficient funds) fee charged by depository institutions *per* overdraft was \$27 in 2007 (FDIC 2008, p.III, bullet 5). At that fee, the implicit annual percentage interest (APR) on a hypothetical, two week overdraft of \$60 is about 1,173 percent, more than the typical APR for deferred deposit credit.¹⁶ The implicit APR on overdraft credit increases, all else equal, as the size or term (maturity) decreases.¹⁷

Repeated overdrafts are common for a subset of users, as shown in Table 1. About nine percent of depositors studied by the FDIC (2008) overdrew ten or more time *per* year, resulting

¹⁴ Starting with the population of banks scheduled for examination between May and December 2007, the FDIC surveyed a stratified, random sample of 462 institutions about their automated overdraft programs. Of those, a non-random sample of 39 banks were asked to provide transaction-level data.

¹⁵ LOC are opt-in services charging interest comparable to credit card rates. “Bounce protection,” by contrast, is the opt-out (default) choice charging flat fee rates that often imply implicit interest rates at three digit levels.

¹⁶ The implicit annual percentage rate is $(\$27/\$60)*26*100$.

¹⁷ Using actual overdraft transactions on 1339 accounts at a small Midwestern depository institution, Fusaro (2008) reckons the median APR exceeded 4,000%, with “chronic” overdrafters paying \$3,440 annually in fees.

in average fees incurred of \$451 to \$1610 *per year*. That fact is notable, as repeat (“chronic”) usage of deferred deposit credit is also common.

Table 1: The Distribution of Deposit Overdrafts and Fees Paid to Banks in 2006

<i># of overdrafts per year</i>	<i>% of depositors</i>	<i>Annual fees paid (\$)</i>
0	75.0	0
1 – 4	12.0	64
4 – 9	5.0	215
10 – 19	4.0	451
20 or more	4.9	1610

Source: FDIC (2008, p. IV, Executive Summary points 2,3,4)

Supplying overdraft protection seems profitable for depository institutions by any number of measures. The 1157 banks studied in FDIC (2008) claimed \$2 billion in NSF-related fees in 2006, or \$1.7 million *per bank*.¹⁸ For the median bank, NSF fee income accounted for 43 percent of noninterest income and 21 percent of net operating income.¹⁹

NCUA (National Credit Union Administration), the agency that supervises credit unions and insures their deposits, has not undertaken a study akin to the FDIC (2008), yet all indications are that overdraft revenue is at least as vital to credit unions as to banks (Table 2). By Moebs’ estimates, overdraft revenue accounted for 60.4 percent of credit union net operating income in 2005.

¹⁸ FDIC (2008) Table VIII-1, p. 57.

¹⁹ FDIC (2008) Table VIII-2, p. 58.

Table 2: Importance of Overdraft Revenues to Depository Institutions

	(1)	(2)	(3)
	<i>Overdraft (OD) Revenue (\$ billions)</i>	<i>Net Operating Income (NOI) (\$ billions)</i>	<i>OD Revenue/NOI (percent)</i>
<i>Banks</i>	26.1	\$145.8	17.9
<i>Savings Banks</i>	3.5	21.9	16.0
<i>Credit Unions</i>	3.5	5.8	60.4
<i>Total</i>	33.1	173.7	19.1

Source: Moebs Services ([http://www.moebs.com/Default.aspx?\(tabid=125\)](http://www.moebs.com/Default.aspx?(tabid=125))) using FDIC and NCUA 2003 Call Reports and 5300 Reports

Supplying OD protection is not without risks or costs, however. Depository institutions involuntarily closed 30 million accounts between 2001 and 2005 for “recidivist” check bouncing, and the trend is upward (Campbell, Jerez-Martinez, and Tufano 2008, p.1). The average loss *per* bad account in 2007 was \$310 (FDIC 2008, Table VIII-5).²⁰

Depository institutions use ChexSystems, a “debit bureau,” to identify deposit applicants that have had an account closed for excessive overdraft or non-sufficient funds activity, and Qualifile, a scored version of ChexSystems, to manage and underwrite deposit and OD protection risk (Campbell et al. 2008). Figure 1, based on data from the Qualifile case study by Campbell et al. (2007), reveals how expected revenues and costs on depositors vary across debit score categories. The indexed data, though less than ideal, suffice to make our point here: banks earn positive expected profits on lower-score depositors, the group who are likely users of payday loans as well. First, expected revenue *per* account is mostly declining in debit scores, presumably because lower-scored depositors overdraft more frequently. Second, expected losses *per* bad account are roughly U-shaped in debit scores. Importantly, expected losses for low score

²⁰ Charged-off deposit losses are counted in “residual charge-offs not elsewhere classified” (FDIC 2008 p. 62) Losses on charged-off deposits accounted for 12.6 percent of total gross loan and lease charge-offs in the FDIC study.

depositors is more than compensated for by higher expected revenues, implying positive expected profits on that type.

Perhaps to avoid regulation as credit, including usury limits and interest rate disclosures, the great majority of DI charge a flat fee *per* overdraft that is invariant to the amount or term of overdraft (White 2007). Ninety-eight percent of OD providers charge a flat fee *per* overdraft, regardless of the size or length of the loan (FDIC 2008).

Flat fee pricing is also central to our thesis. That pricing obviously discriminates against more frequent, small-dollar overdrafters, so entry by firms practicing marginal cost pricing is to be expected. Our thesis is that entering deferred deposit may skim off small-dollar overdrafts, saddling depositories with proportionately more of the other type.

II.2 Deferred Deposit Lenders

In 2007 an estimated 24,000 deferred deposit stores were operating in the U.S. (Stephens 2008). Deferred deposit lenders outnumber McDonalds, a frequently noted fact, but they were outnumbered more than five-to-one by the 96,622 branches of FDIC insured financial institutions and 8,101 credit unions operating in 2007.²¹

An estimated 19 million U.S. households demanded DD credit in 2007 (Stevens Inc. 2007). Typical users earns about \$40,000 *per* year, have some college education (but no degree), and are disproportionately “urban,” meaning black or Hispanic (Burley and Simkins 2004; Damar 2009). Pre-existing financial problems--bouncing checks and dunning--are primary reasons households demand deferred deposit credit (Stegman and Faris 2004).

As with overdraft, deferred deposit borrowers demand the credit repeatedly; many customers demand four or five loans *per* year, and a sizable fraction demand ten or twelve loans

²¹ Statistical Abstract of the U.S.. Banks: Table 1141. <http://www.census.gov/compendia/statab/tables/09s1141.pdf>. Credit unions: Table 1143. <http://www.census.gov/compendia/statab/tables/09s1143.pdf>

per year (Elliehausen and Lawrence 2001, Caskey 2002). The distribution of DD credit demand bears uncanny resemblance to the distribution of OD protection demand in Table 1.

Deferred deposit underwriting is minimal; applicants must prove that they have a checking account and a job. The checking account pre-requisite makes checking accounts and deferred deposit credit partial complements, implying positive correlation in the individual demand for each. Given a deposit account, however, DD credit and OD protection are substitutes, implying negative correlation in their individual demand. That asymmetric technological relationship might help account for some of our findings. Consistent with the notion that deposit and deferred deposit services are related, deferred deposit providers tend to locate in well-banked neighborhoods (Damar 2009).

III. Deferred Deposit Lenders (DD) Entry and Exit as “Experiments”

Because of the controversy surrounding DD credit, the state laws governing it have been in flux. Following Melzer (2009) and Morgan and Strain (2008), we use those fluctuations to identify plausibly, or at least arguably, exogenous variation in DD credit supply. We identify fluctuations or differences in regulation in 14 states. The appendix documents the regulatory differences in detail.

With a few exceptions, New England states have barred entry of payday lenders by strict enforcement of usury limits. Other states have closed markets outright or indirectly, *via* prohibitive usury limits, while a few have sanctioned and safe harbored the practice. Using those differences, we define two distinct indicators of DD credit availability.

$Allowed_{sy}$ equals one for institutions located in a state s where DD credit is allowed in year y , and zero otherwise. Because our regressions (discussed momentarily) include state fixed effects, the variation that identifies the effect of $Allowed$ comes from states that switch from

prohibiting to allowing DD credit, and vice-versa. Two states, NH and RI, switched from prohibiting to allowing 2000 and 2001. D.C. and six states switched from allowing to prohibiting DD credit: MD, GA, NC, WV, PA, and OR.

Our identifying assumption is that political-economy decisions driving changes in *Allowed* are exogenous with respect to outcomes. While that assumption may be arguable, we find it plausible given the absence of any evidence to the contrary.

The 2nd availability measure is actually a sequence of distance-based indicators. $Access_X_Y_{cy}$, is a county-year level indicator equal to one if an institution is located in a county whose center is within X and Y miles of a state that allows payday lending (zero if not).²² For example, $Access_0_10$ equals one if an institution is in a county located 10 miles or less from a state that allows payday loans, and zero otherwise. $Access_10_20$ and $Access_20_30$ are defined analogously. The omitted category is $Access_30_plus$.

The identifying variation in *Access* comes by comparing values of the dependent variables for institutions relatively near states that allow DD credit to values at institutions more remote from DD-allowing states. The identifying assumption behind *Access* is that the distance between institution i and a state where DD credit is allowed is exogenous with respect to overdraft terms at institution i , a weaker assumption than needed for *Allowed*.^{23 24}

The institutional and county characteristics defined by *Allowed* and *Access* differ in a few ways (Table 3). States with changes in *Allowed* have higher proportions of Hispanics and blacks,

²² We use the county center because we do not know the exact location of institution within the county.

²³ Our identifying assumption requires, firstly, that DD credit regulations in bordering states are uncorrelated with characteristics of the overdraft market across the border, and secondly, that DI do not locate based on DD credit availability in some way that alters the composition of DI near the border. To weaken the latter assumption, we control for the institution type, institution size (log assets), and the concentration of the local deposit market. Also reassuring is that Moebs almost always surveys the main branch, a location that typically determined long before DD lenders arrived on the scene.

²⁴ The eleven states that prohibit payday lending for some time during the sample period are: CT, GA, MA, MD, NC, NH, NJ, NY, RI, VT, WV.

consistent with Burkey and Simkins (2004) and Damar (2009), and relatively more savings banks (versus commercial banks). Savings banks are also over-represented (relative to commercial banks) in counties without access to DD credit ($Access_0_10 = 1$). Unemployment rates are significantly lower in those counties as well. Importantly, our regression analysis controls for those differences by including institution and county-level controls.

IV. How Overdraft (OD) Terms Vary with DD Access

IV.1. Data

The data on overdraft prices and “free” checking are collected by Moebs Services of Lake Bluff, Illinois through a telephone survey.²⁵ Moebs draws a random sample of institutions – stratified by region, asset size and institution type – and calls each institution’s main branch to assess fees charged to customers at that specific location.²⁶

The full space of data spans roughly 20,000 branch-year observations, half on commercial banks, 40 percent on credit unions, and 10 percent on savings banks. The two variables of interest are OD, the fee charged *per* overdraft event, and FREE CHECKING, a binary variable indicating whether an institution offers free checking accounts. OD, measured in constant (2008) dollars, is observed at banks from 1995 to 2008, and at credit unions from 1999 to 2008.²⁷ FREE CHECKING is observed from 2003 to 2008.

Sample statistics for the dependent variables are in Table 4. The average fee for overdraft is \$25. Note the sample variation in OD; some institutions charge upwards of \$50. Although free

²⁵ In addition to conducting the survey, Moebs markets overdraft protection programs and other consulting services to depository institutions. The survey was initially implemented to collect data for the Federal Reserve’s Annual Report to the Congress on Retail Fees and Services of Depository Institutions (1997 to 2003).

²⁶ Many banks with regional or national branch networks are chartered separately in each state. Moebs samples from the population of chartered institutions, so a single bank holding company might be sampled multiple times in a given year, across separately chartered subsidiaries.

²⁷ Nominal prices are converted to real prices, in 2008 dollars, using the level of the June CPI from 1995 to 2008.

lunches are said not to exist, “free” checking is ubiquitous; about 75 percent of DI offered it.²⁸

Some OD protection providers explicitly link their OD programs with “free” checking.²⁹ OD fees and the availability of “free” checking differ across types of institution. Credit unions and savings banks charge significantly lower fees, and were more likely to supply “free” checking, especially on accounts without direct deposit.

We match the Moebs survey data with balance sheet and income statement data filed by each institution with the FDIC (Federal Depository Insurance Corporation) and NCUA (National Credit Union Administration).³⁰ We also use the FDIC’s Summary of Deposits database to calculate the HHI (Hirshman-Herfindahl index) of bank deposit market concentration for each county and year.³¹ County characteristics including median income, racial composition, home ownership, population and percent urban population, are from the 2000 Census. Unemployment rates, by county and year, are from the Bureau of Labor Statistics’ Local Area Unemployment Statistics.

IV.2. Findings with *Allowed*

We estimate the impact of deferred deposit credit availability on overdraft fees and “free” checking *via* difference-in-difference regressions of the form:

$$(1) Y_{icsy} = \alpha + a_s + a_y + \beta ALLOWED_{sy} + \theta HHI_{cy} + \bar{\gamma} CNTY_{cy} + \bar{\pi} INST_{iy} + \varepsilon_{icsy}.$$

²⁸ “Free” checking, as distinct from free *checks*, means fees are not levied until the account balance is negative, in which case NSF or OD prices apply.

²⁹ John M. Floyd, for example. See “Overdraft Protection, How Banks turn Rubber into Gold By Enticing Consumers to Write Bad Checks,” Consumer Federation of America and National Consumer Law Center.

³⁰ These databases are populated through regulatory filings – bank and credit union Call Reports, and Thrift Financial Reports.

³¹ NCUA does not collect the equivalent data for credit unions so credit union market shares cannot be calculated.

Y_{icsy} represents OD or FREE CHECKING at institution i in county c , state s , at year y . The fixed effects (α_s and α_y) control for differences in the mean of Y across states and years. Some versions of (1) include a Census division-year effect to control for more regional-specific trends. HHI measures bank deposit market concentration in each county-year. CNTY denotes a vector of eight county-level control variables, including the unemployment rate, which varies across years.³² INST controls for the natural log of assets and the type of DI (with dummy variables): saving bank, credit union, or commercial bank (the omitted category). The regressions are estimated by ordinary least squares, but we report probit estimates of FREE CHECKING in robustness tests. Observations are grouped by state in calculating Huber-White robust standard errors.³³

The key coefficient, β , measures how OD and FREE CHECKING vary with *Allowed*. Textbook theory implies $\beta < 0$, but given the possibility of price-increasing competition and our adverse selection hypothesis, we reserve the possibility of $\beta > 0$.

Table 6 reports estimates of (1). Before considering β , note the institutional differences. Even after controlling for institution size, credit unions and savings banks charge significantly lower fees for overdraft than commercial banks. The difference for credit unions is about \$2.30, nine percent relative to average overall. The difference for savings banks is about \$1.20, five percent relative to average. Credit unions and savings banks are also significantly more likely to supply “free” checking; credit unions are 24 percentage points more likely to offer “free” checking than commercial banks. Savings banks are about nine percent more likely. The differences in fees and “free” checking for credit unions (though not savings banks) are

³² The county-level Census controls are cubics in median income, population and percent urban population; percent black, white, Hispanic and Asian; percent home ownership and percent foreign born.

³³ Clustering by state addresses the Bertrand et al. (2004) concern that serially correlated outcomes bias standard error estimates in differences-in-differences regressions.

potentially consistent with their non-profit charter, though it might also indicate that deposit and overdraft protection demand at those institutions is more price-elastic.

LogAssets has a significant, positive coefficient in every model, implying that OD fees and the probability of “free” checking are increasing with institution assets. By contrast, the coefficient on *HHI* is insignificant in every model; OD and “free” checking supply are uncorrelated with local deposit market concentration.

Now consider β . The coefficient on *Allowed* is significantly negative in all three FREE CHECKING regressions; institutions are less likely to offer free checking in states where DD credit is allowed. The estimate in column (3), the model with the maximal set of controls, implies that depositories are seven percentage points (ten percent relative to average overall) less likely to supply free checking when their state allows payday loans.³⁴

Overdraft prices tend to increase when payday loans are allowed. β is positive across all six regressions models. The estimate in column (2), panel B implies OD prices increase by \$1.31 when DD credit is available, a 5 percent increase relative to average overall the sample.

The estimates are smaller and insignificant in the models with Census division-year fixed effects. Including those more regional specific trend differences makes the control group for each transitioning state its neighboring states instead of all states.³⁵ That raises some concern about reverse causality operating at the regional level. However, even in that case we find no evidence of price-decreasing competition.

³⁴ Since *FREE CHECKING* is binary, this model assumes linear probability; we relax that assumption in a robustness exercise.

³⁵ There are nine Census Divisions comprising from three to nine states each.

IV.3. Findings with Access

States with Payday stores may choose to contest markets with high OD fees, raising concerns about endogeneity. Using *Access* instead of *Allowed* reduces those concerns; *Access* distinguishes institutions in counties that just happen to be located near where DD credit is available. The effect of *Access* on the dependent variables comes from comparing their values at institutions near payday-allowing states to values at institutions relatively far from payday-allowing states. The identifying assumption is that the distance between a given depository institution and the nearest payday-allowing state is uncorrelated with other determinants of the dependent variable. We include all years and states in the sample in estimating impact of *Access*, but identifying variation comes from institutions in the eleven states that prohibited payday lending at some time during the sample period. Including observations from other states improves precision of the estimates.³⁶

The regression model is:

$$(2) Y_{icsy} = \alpha + a_{st} + \tilde{\beta} \mathbf{ACCESS}_{cy} + \tilde{\gamma} \mathbf{CNTY}_c + \delta \mathbf{BORDER}_c + \theta \mathbf{HHI}_{cy} + \tilde{\pi} \mathbf{INST}_{icsy} + \varepsilon_{icsy}.$$

Apart from replacing *Allowed* with *Access*, model (2) differs from (1) in two ways. First, (2) includes a state-year effect (instead of state and year effects) to isolate variation in *Access* that is unrelated to the state-level changes payday availability captured by (1). Second, some specifications of (2) include *Border*, a dummy indicating whether an institution is located in a county within 25 miles of a state border. *Border* controls for general differences between institutions located near a state border and more interior counties.

³⁶ The eleven states that prohibit payday lending for some time during the sample period are: CT, GA, MA, MD, NC, NH, NJ, NY, RI, VT, and WV.

Table 6 reports regression estimates. We observe the same significant differences across types of institutions and size of institution as with regression model (1). Market concentration (HHI) is insignificant, as before.

The main results with *Access* are very similar to those with *Allowed*. Given county characteristics and type of institution, depository institutions are about 9 percentage points less likely to offer free checking if deferred deposit credit is accessible within 10 miles, with no discernible effect at greater distances. OD fees are significantly higher when deferred deposit credit is accessible. These estimates are very close to the earlier estimates; given the type and size of institutions and other controls, OD fees are \$1.48 higher when deferred deposit credit is available within 10 miles. Access beyond ten miles does not significantly affect OD prices.

In summary, the main results in Tables 5 and 6 indicate depository institutions raise OD fees and reduce availability of “free” checking when deferred deposit credit is available, suggesting price-*increasing* competition. Before we present auxiliary findings on the adverse selection hypothesis that helps explain the result, we confirm that the main results are robust to several alternative specifications.

IV.4. Robustness

Table 7 shows that the main findings are robust to several alternative functional forms. Estimating a probit model for FREE CHECKING (panel A) yields marginal effects very similar to the linear probability estimates in the main results. A log-linear model, with Log(OD) as the dependent variable, also yields an estimated effect of *Allowed* and *Access* of between four percent and six percent. This analysis confirms that the nominal to real price adjustment does not change the results.

Table 8 confirms the results of model (2) using a continuous measure, *LogDistance*, instead of *Access*. A one percent increase in the distance to a state that allows deferred deposit credit increases the probability “*Free*” *Checking* is available by four percentage points and decreases OD fees about 50 cents.

V. Auxiliary Findings

This section presents additional findings suggesting that price-increasing competition is due at least in part to adverse selection. Our hypothesis, again, is that mispriced OD protection lets DD lenders skim-off depositors discriminated against by flat fee pricing.

V.1. Free Checking With Direct Deposit & Without

Recall that “free” checking is less available when deferred deposit credit is available. That finding might partly reflect that a checking account is a complement, pre-requisite actually, for DD credit, so their demand is positively correlated. While granting that possibility, we conjecture it also has to do with the possibility that “free” checking is less profitable to depository institutions when deferred deposit credit is available to depositors. Depository institutions may use “free” checking as loss leader that is compensated for by expected revenue from overdrafts. If deferred deposit credit helps depositors avoid overdrafts, the loss leader becomes a money loser. That logic predicts the decline in “free” checking will be more pronounced for deposits without direct deposit.

It is (Table 9). In fact, DD credit availability affects only the supply of “free” checking accounts without direct deposit. Also observe that institutional differences in the main results—the greater propensity for credit unions and savings banks to supply “free” checking-- is significant only for accounts without direct deposit. Credit unions and savings banks may rely

more on overdrafts on accounts without direct deposit to compensate for providing “free” checking services.

V.2. Institutional Differences

Credit unions and savings banks, the former particularly, charge lower fees for OD and are more likely to offer “free” Checking (at least on accounts without direct deposit). At least for credit unions, that gap might reflect their not-for-profit charter and mission, though it might also partly reflect that depositors are more price-elastic.

Table 10 supports that prediction. Competition from DD lenders narrows the gap between fees charged by banks, on the one hand, and credit unions and savings banks, on the other. About \$1.75 of the roughly \$2.40 price gap is explained by the differential response of the various depository institutions to competition from DD lenders. Their social mission notwithstanding, credit unions appear less generous when competing with DD lenders.

V.3. Differential Effects by Deposit Market Concentration

Recall from the main results that OD is uncorrelated with deposit market concentration (HHI), a result at odds with the findings elsewhere in the literature of lower checking deposit rates in more concentrated markets. Table 11 shows how our contrary result changes when we interact HHI with measures of DD credit availability. The coefficients on *Allowed*HHI* and *Access_0_10*HHI* are negative and large in absolute value. The former coefficient is significant at the five to ten percent level. The “own” coefficient on HHI is much larger here than in the main results, and the coefficient is significant specification (1) of panel C.

These results have two implications. First, competition from DD lenders *does* tend to lower prices for OD in sufficiently concentrated markets, as textbook theory predicts. Price-increasing competition is observed only in more competitive markets where mark-ups are likely

to be small even without deferred deposit competition; therefore the fall in prices due to the “market share effect” that Chen and Riordan (2008) discuss is likely to be small in this case, and outweighed by the price-increasing aspects of deferred deposit competition. Second, the positive correlation between market concentration and OD fees is smaller when DD credit is available. Deferred deposit lenders contest markets where increasing concentration would, in their absence, increase OD fees.

V.4. Deferred Deposit Access and Returned Check Amounts

The auxiliary findings thus far provide indirect evidence for the adverse selection hypothesis, and here we provide more direct evidence using a different data source. The adverse selection hypothesis implies that the average amount *per* returned check at depository institutions should increase when DD credit is available. We test that prediction using data from Federal Reserve Regional Check Processing Centers (CPC). These are the same data Morgan and Strain (2008) study, extended to 2008:Q3 so that we can study more recent changes in DD regulation.³⁷

Some limitations of the data require discussion. Fed CPCs operate regionally; a CPC might process checks drawn on depository institutions from other states (which introduces some error in variables) and some states do not have a Fed CPC (which limits the events we can study). Rhode Island, New Hampshire, and Oregon have never had a CPC within their borders so we omit the changes in regulation in those states from our set of “experiments.” That leaves five events, all bans, in five states (GA, NC, MD, WV, and PA) with which we identify the effect of deferred deposit credit access on rates and amounts of returned checks. Morgan and Strain (2007) considered only GA and NC.

³⁷ The Federal Reserve clears checks for banks, credit unions, and other depository institutions. The 45 Fed CPC operating in 2003 cleared about 38 percent of the estimated 36.6 billion checks written on all types of U.S. depository institutions that year, including credit unions and savings banks. Federal Reserve 2005 Check Restructuring Factsheet. <http://www.federalreserve.gov/boarddocs/press/other/2004/20040802/attachment2.pdf>.

With electronic payments supplanting checks, the Federal Reserve in 2004 began consolidating its check processing operations by closing some CPCs and transferring their operations to others. Three of those mergers involved CPCs located in the states we are considering here.³⁸ To maintain continuous series for those CPCs, we create *pro forma* series by combining the data for those CPCs at the beginning of the observation period. For example, the Columbia, SC CPC was closed and its operations were transferred to the Charlotte, NC in August, 2004. Combining their data at the beginning of the observation period creates a *pro forma* “Charlotte-Columbia” CPC that reflects joint activity at the CPC. Having to use *pro forma* series tends to attenuate the impact of the ban.

To see how returned check patterns vary with access to deferred deposit credit we estimate difference-in-difference regressions of the form:

$$(3) Y_{cdt} = \alpha + a_c + a_t + \beta Allowed_{ct} + \gamma Unemployment_{dt} + \kappa Processed_{ct} + \varepsilon_{ct}.$$

The dependent variable, Y_{cdt} , denotes either 1) the *rate* of returned checks or 2) the average dollar amount *per* returned check at CPC c in Federal Reserve District d at time (year-quarter) t . The rate of returned checks is measured in two ways: 1) number of returned checks *per* number of checks processed; and 2) dollar value of returned checks *per* dollar value of checks processed. The former seems more pertinent here because deferred deposit credit users, having lower than average income, are likely to write (and bounce) checks of smaller than average value, and the effect of these on the dollar measure will be muted. The regressions

³⁸ In 2004, the CPC in Columbia (SC), Charleston (WV), and Richmond (VA) were folded into the CPC in Charlotte (NC), Cincinnati (OH), and Baltimore (MD). Board of Governors of the Federal Reserve System. “Availability of Funds and Collection of Checks,” 12 CFR Part 229 – Regulation CC; Docket No. R-1150 retrieved from <http://www.federalreserve.gov/paymentsystems/checkrestruct/r1150.pdf> on April 29, 2009, and “Looking Ahead at Phase Two of the Fed’s Check Restructuring,” Federal Reserve Bank of St. Louis Payments Quarterly, Volume 9, No. 3, pp. 3. Retrieved from: http://stlouisfed.org/publications/pq/2004/c/summer_autumn.pdf, retrieved April 29, 2009.

include a fixed effect for each CPC (a_c) and each date (a_t). *Allowed* is defined as before, except the NH, RI, and OR events are excluded. $Unemployment_{dt}$ denotes the unemployment rate in the Federal Reserve District whether CPC c is located at t . $Processed_{ct}$ denotes the quantity of checks processed *per* quarter at CPC c in t . This variable controls for demand for check payments in the Federal Reserve District, which should reflect economic conditions in turn.

Summary statistics are reported in Table 12. The average rate of returned checks *per* number processed is 1.26 percent. The mean dollar amount *per* returned item is \$872 and the median amount is \$758. Those amounts are larger by an order of magnitude than the means and medians in FDIC (2008), presumably because the FDIC counted all overdrafts, protected or not, while our data only cover unprotected overdrafts; risk-averse banks may hesitate to cover \$800 overdrafts.

The regression results indicate that the returned check rate *per* checks processed declines when payday lending is allowed, confirming Morgan and Strain (2008), while the amount *per* returned check rises, consistent with our adverse selection hypothesis (Table 13). The estimates in column (2) imply that the returned check rate *per* checks processed decreases by 0.4 percentage points, or 32 percent relative to average, when a state switched to allowing deferred deposit lending. The average amount *per* return increases by 15 percent relative to average, from \$872 to \$1006. The returned check rate *per* \$ processed also decreases with *Allowed*, but the effect is statistically insignificant.

Those results square with the adverse selection hypothesis. When deferred deposit credit is available, depositors prone to frequently bouncing small checks may switch to less expensive payday loans. The depositors that do not switch are prone to bouncing larger checks, where overdraft is not such a bad deal.

VI. Conclusion

Faced with competition from deferred deposit, or “payday,” lenders, mainstream depository institutions charge higher overdraft fees and cut back on “free” checking offers, particularly those without direct deposit.

The auxiliary findings we present suggest these changes reflect that banks and credit unions suffer adverse selection when payday lenders enter the market. Small dollar overdrafters disadvantaged by the buffet (flat fee) pricing of overdraft credit switch to deferred deposit lenders (when available), saddling banks and other depositories with proportionately more higher cost, possibly riskier large-dollar overdrafts. Depository institutions raise prices and manage the extra risk by reducing the supply of free accounts without direct deposit.

Without a model, the welfare implications of our findings are not entirely clear. It might appear that the depositors who switch to deferred deposit lenders gain, but those who stick with bank overdraft at the new higher price lose.³⁹ However, Gabaix and Laibson (2006) use overdraft protection as the leading example of a “shrouded attribute,” an expensive, overpriced feature of a good or service that is hidden from consumers. “Debiasing,” that is, educating consumers by unshrouding hidden attributes is welfare increasing.⁴⁰

³⁹ Our findings might reconcile the salutary effects of deferred deposit access in Morgan and Strain (2007) with the inimical effects in Melzer (2009); perhaps Melzer (2009) is detecting the households which stick with (now higher priced) overdraft, while Morgan and Strain (2007) are picking up the households who select away from overdraft.

⁴⁰ There is also a competing effect within the context of the shrouded attributes model. Shrouding only develops when sophisticates can avoid the “add-on” as sufficiently low cost (“e”). The introduction of the substitute lowers “e” for sophisticates, making shrouding, all else equal, more likely in equilibrium. In the context of overdraft, that implies banks are more likely to lower prices for the base good but charge higher add-on prices. We are finding higher add-on prices, but also higher base good prices.

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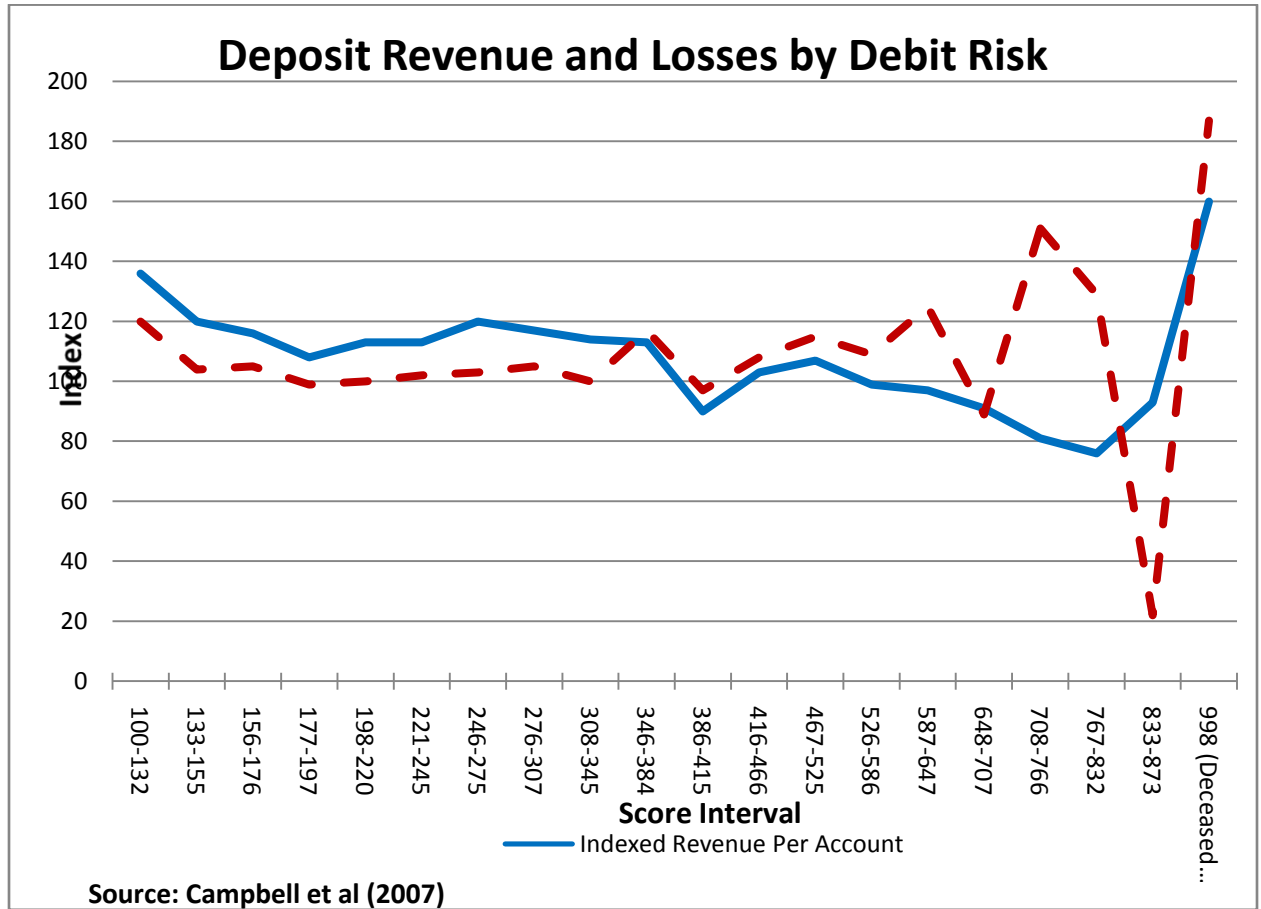
Figure 1

Table 3: Average Institution and County Characteristics, by Change in *Allowed* and *Access_0_10*.

Reported are means and number of observations (N). *Allowed* =1 for states in institutions allowing payday lending , 0 otherwise. *Access_0_10* indicates whether payday loans are available within ten miles of center of county where institution is located.

Institution	No Change <i>Allowed</i>	Change in <i>Allowed</i>	Diff. significant at 5%			
	(17,837)	(2375)		<i>Access_0_10</i> = 0	<i>Access_0_10</i> = 1	Diff. significant at 5% level
Credit Union	0.41	0.41		0.44	0.49	
Commercial Bank	0.47	0.45	*	0.30	0.36	*
Savings Bank	0.12	0.14	*	0.26	0.15	*
Total Assets†	2,409,000	2,738,000		3,875,000	1,824,000	
<hr/>						
County	(1,750)	(264)		(199)	(38)	
Median Income	36,900	37,400		42,800	42,700	
Population	126,500	132,600		283,400	198,700	
Percent urban	0.49	0.51		0.64	0.60	
Home ownership	0.73	0.72		0.69	0.71	
Percent white	0.82	0.81		0.83	0.84	
Percent black	0.07	0.13	*	0.08	0.09	
Percent hispanic	0.07	0.03	*	0.05	0.03	
Percent foreign born	0.04	0.03		0.06	0.05	
<hr/>						
County-Year						
Unemployment Rate	0.052	0.052		0.050	0.046	*
(N)	(7,764)	(234)		(931)	(155)	
HHI	0.21	0.21		0.17	0.18	
(N)	(7,675)	(1,114)		(931)	(155)	

† N = 17,763 for no Change in *Allowed*, N= 2,374 for change in *Allowed*, N = 2802 for *PaydayAccess_0_10* = 0

Table 4: Summary Statistics for OD and Free Checking by Type of Institution

	Panel A: All Institutions				Panel B: Banks				Panel C: Credit Unions			
	obs	mean	std dev	median	obs	mean	std dev	median	obs	mean	std dev	median
<i>Overdraft (OD) fee</i>	15,089	24.98	7.32	25.95	10,345	25.73	7.33	26.80	4,744	23.34	7.00	24.59
<i>Free Checking</i>	10,542	0.73	0.44	1	5,253	0.66	0.47	1	5,289	0.81	0.39	1
<i>Free Checking w/o Direct Deposit</i>	9,626	0.62	0.48	1	4,339	0.52	0.50	1	5,287	0.71	0.46	1
<i>Free Checking w/ Direct Deposit</i>	9,626	0.11	0.31	0	4,339	0.12	0.33	0	5,287	0.10	0.30	0

Table 5: Effects of Allowing Deferred Deposit Credit on Overdraft Terms and Free Checking

Reported are OLS regression estimates (robust standard errors clustered by state). *Allowed* =1 for institutions located in state allowing deferred deposit credit, zero otherwise.

	Dependent Variable (mean):					
	<i>FreeChecking</i> (0.73)			<i>OD</i> (24.98)		
	(1)	(2)	(3)	(1)	(2)	(3)
<i>Allowed</i>	-0.051** (0.024)	-0.049** (0.022)	-0.069*** (0.025)	1.09* (0.62)	1.31** (0.52)	0.40 (0.78)
<i>CreditUnion</i>		0.24*** (0.03)	0.24*** (0.03)		-2.38*** (0.38)	-2.42*** (0.38)
<i>SavingsBank</i>		0.08** (0.03)	0.09** (0.03)		-1.22*** (0.24)	-1.17*** (0.24)
<i>LogAssets</i>		0.04*** (0.01)	0.04*** (0.01)		0.96*** (0.09)	0.95*** (0.09)
<i>HHI</i>		0.04 (0.05)	0.05 (0.06)		-0.33 (0.99)	0.13 (0.95)
State and Year FEs?	Y	Y	Y	Y	Y	Y
County Controls?	N	Y	Y	N	Y	Y
Division-Year Trend	N	N	Y	N	Y	Y
Observations	10,524	10,505	10,505	15,072	15,041	15,041
R ²	0.04	0.10	0.11	0.19	0.32	0.34

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6: Effects of County-Level Deferred Deposit Availability on Overdraft Terms and Free Checking

Reported are OLS estimates (robust standard errors clustered by county). *Access_X_Y* equals 1 if institution is located in county whose center is within Y and X miles of a state that allows.

Dependent Variable: (Mean)	<i>FreeChecking</i> (0.73)		<i>OD</i> (24.98)	
	(1)	(2)	(1)	(2)
	(1)	(2)	(1)	(2)
<i>Access_0_10</i>	-0.051 (0.04)	-0.088** (0.04)	1.20** (0.56)	1.48*** (0.55)
<i>Access_10_20</i>	-0.05 (0.04)	-0.05 (0.04)	0.14 (0.60)	0.22 (0.66)
<i>Access_20_30</i>	0.01 (0.03)	0.02 (0.03)	-0.18 (0.70)	-0.08 (0.58)
<i>CreditUnion</i>		0.24*** (0.02)		-2.39*** (0.21)
<i>SavingsBank</i>		0.09*** (0.02)		-1.10*** (0.21)
<i>LogAssets</i>		0.04*** (0.00)		0.95*** (0.05)
<i>HHI</i>		0.06 (0.06)		-0.07 (0.67)
<i>Border</i>		0.04*** (0.01)		-0.32* (0.18)
State-Year FEs?	Y	Y	Y	Y
County Controls?	N	Y	N	Y
Observations	10,524	10,490	15,072	14,996
R ²	0.07	0.12	0.24	0.37

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 7: Robustness Relative to Functional Form

Results are provided for the following variations on the basic empirical models in Tables 3 and 4. Regressions in Panel A assume a probit functional form for Free Checking as opposed to a linear probability model. Regressions in Panels B use the log of OD as the dependent variable. Robust standard errors grouped by state are reported in parenthesis.

Estimation Method: Dependent Variable: (Mean)	Panel A		Panel B	
	Probit <i>Free Checking</i>		OLS <i>LogOD</i>	
	(0.73)		(3.19)	
	(1)	(2)	(1)	(2)
<i>Allowed</i>	-0.063** (0.030)		0.061** (0.026)	
<i>Access_0_10</i>		-0.10*** (0.04)		0.042* (0.024)
<i>Access_10_20</i>		-0.06 (0.05)		-0.01 (0.03)
<i>Access_20_30</i>		0.02 (0.04)		0.00 (0.02)
<i>CreditUnion</i>	0.25*** (0.02)	0.26*** (0.02)	-0.09*** (0.02)	-0.09*** (0.01)
<i>SavingsBank</i>	0.07** (0.03)	0.08*** (0.02)	-0.04*** (0.01)	-0.04*** (0.01)
<i>LogAssets</i>	0.04*** (0.005)	0.05*** (0.004)	0.04*** (0.004)	0.04*** (0.002)
<i>HHI</i>	0.06 (0.06)	0.08 (0.07)	0.03 (0.04)	0.04 (0.03)
<i>Border</i>		0.04*** (0.02)		-0.01 (0.01)
State-Year FEs?	N	Y	N	Y
State and Year FEs?	Y	NA	Y	NA
County Controls?	Y	Y	Y	Y
Observations	10,484	10,269	14,828	14,784
R ² /Pseudo-R ²	0.09	0.10	0.25	0.30

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 8: Robustness Relative to Access

Reported are regression coefficients (robust, clustered standard errors) for models use LogDistance, the natural logarithm of the distance to the nearest allowing state) instead of *Access_X_Y*.

Dependent Variable: (Mean)	(1) <i>Free Checking</i> (0.73)	(2) <i>OD</i> (24.98)
<i>LogDistance</i>	0.04* (0.02)	-0.48* (0.26)
<i>CreditUnion</i>	0.24*** (0.02)	-2.39*** (0.21)
<i>SavingsBank</i>	0.09*** (0.02)	-1.12*** (0.22)
<i>LogAssets</i>	0.04*** (0.003)	0.95*** (0.05)
<i>HHI</i>	0.05 (0.07)	-0.06 (0.67)
<i>Border</i>	0.04*** (0.01)	-0.31* (0.19)
State-Year FEs?	Y	Y
County Controls?	Y	Y
Observations	10,390	14,903
R ² /Pseudo-R ²	0.12	0.37

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 9: Differential Effects on Free Checking by Direct Deposit

Reported are regression coefficients (robust, clustered standard errors) indicating if effect of deferred deposit availability or access on free checking differs for deposits without (panel A) or with (panel B) direct deposit.

Dependent Variable: (Mean)	Panel A <i>Free Checking</i> <i>w/o Direct Deposit</i> (0.62)		Panel B <i>Free Checking</i> <i>w/Direct Deposit</i> (0.11)	
	(1)	(2)	(1)	(2)
<i>Allowed</i>	-0.039* (0.020)		-0.0003 (0.023)	
<i>Access_0_10</i>		-0.10** (0.05)		-0.01 (0.02)
<i>Access_10_20</i>		-0.12** (0.05)		0.04 (0.03)
<i>Access_20_30</i>		-0.05 (0.04)		0.05* (0.03)
<i>CreditUnion</i>	0.26*** (0.03)	0.25*** (0.02)	-0.001 (0.02)	0.002 (0.01)
<i>SavingsBank</i>	0.05 (0.04)	0.05* (0.03)	0.02 (0.01)	0.02 (0.02)
<i>LogAssets</i>	0.03*** (0.006)	0.03*** (0.004)	0.01*** (0.002)	0.01*** (0.003)
<i>HHI</i>	0.004 (0.06)	0.01 (0.08)	0.02 (0.03)	0.03 (0.05)
<i>Border</i>		0.06*** (0.02)		-0.03** (0.01)
State-Year FEs?	N	Y	N	Y
State and Year FEs?	Y	NA	Y	NA
County Controls?	Y	Y	Y	Y
Observations	9,589	9,576	9,589	9,576
R ²	0.11	0.13	0.03	0.05

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 10: Differences in Effect of Deferred Deposit Availability by Depository Type.

Reported are regression coefficients (robust, clustered standard errors) testing whether gap between OD prices charged by banks and credit unions and savings banks narrows with deferred deposit credit access

Dependent Variable: (Mean)	Panel A <i>Free Checking</i>		Panel B <i>OD</i>	
	(0.73)		(24.98)	
	(1)	(2)	(1)	(2)
<i>PaydayAllowed</i>	-0.04 (0.03)		2.18*** (0.67)	
<i>PaydayAllowed*Bank</i>	-0.02 (0.05)		-1.49* (0.77)	
<i>PaydayAccess_0_10</i>		-0.08** (0.04)		2.62*** (0.62)
<i>PaydayAccess_0_10*Bank</i>		0.01 (0.03)		-1.78*** (0.47)
<i>HHI</i>	0.04 (0.05)	0.06 (0.07)	-0.30 (0.99)	-0.08 (0.67)
<i>CreditUnion</i>	0.23*** (0.04)	0.25*** (0.03)	-3.67*** (0.65)	-3.96*** (0.47)
<i>SavingsBank</i>	0.08** (0.03)	0.09*** (0.03)	-1.35*** (0.28)	-1.26*** (0.22)
<i>LogAssets</i>	0.04*** (0.01)	0.04*** (0.003)	0.95*** (0.09)	0.94*** (0.05)
<i>Border</i>		0.03** (0.01)		-0.33* (0.18)
State-Year FEs?	N	Y	N	Y
State and Year FEs?	Y	NA	Y	NA
County Controls?	Y	Y	Y	Y
Observations	10,505	10,490	15,041	14,996
R ² /Pseudo-R ²	0.10	0.12	0.33	0.37

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 11: Differential Effects by Deposit Market Competition

Reported are regression coefficients (robust, clustered standard errors) indicating whether response of Free Checking and OD fees to deferred deposit credit availability depends on banking market deposit concentration (HHI)

Dependent Variable: (Mean)	Panel A <i>Free Checking</i> (0.73)		Panel B <i>OD</i> (24.98)	
	(1)	(2)	(1)	(2)
<i>Allowed</i>	-0.05 (0.04)		1.92*** (0.60)	
<i>Allowed*HHI</i>	0.03 (0.15)		-3.27* (1.77)	
<i>Access_0_10</i>		-0.09** (0.04)		1.68*** (0.60)
<i>Access_0_10*HHI</i>		0.07 (0.14)		-1.59 (2.11)
<i>HHI</i>	0.01 (0.14)	0.001 (0.13)	2.63 (1.60)	1.38 (2.04)
<i>CreditUnion</i>	0.24*** (0.03)	0.24*** (0.02)	-2.38*** (0.38)	-2.39*** (0.21)
<i>SavingsBank</i>	0.08** (0.03)	0.09*** (0.02)	-1.21*** (0.25)	-1.10*** (0.21)
<i>LogAssets</i>	0.04*** (0.01)	0.04*** (0.003)	0.95*** (0.09)	0.95*** (0.05)
<i>Border</i>		0.03** (0.01)		-0.30* (0.18)
State-Year FEs?	N	Y	N	Y
State and Year FEs?	Y	NA	Y	NA
County Controls?	Y	Y	Y	Y
Observations	10,505	10,490	15,041	14,996
R ² /Pseudo-R ²	0.10	0.12	0.32	0.37

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 12: Statistics on Returned Checks and other Regression Variables

Check statistics calculated using data from Federal Reserve Check Processing Centers (CPC) over 1998:Q1 - 2008:Q3.
Unemployment rate measured at Federal Reserve District level

Variable	Obs	Mean	Median	Std. Dev.	Min.	Max.
<i>numbers of checks (million)</i>						
<i>returned/processed (%)</i>	1513	1.26	1.14	0.63	0.34	6.01
<i>returned</i>	1513	1.37	1.10	0.90	0.03	4.78
<i>processed</i>	1513	108.93	96.47	54.88	2.62	303.11
<i>\$ of checks (billion)</i>						
<i>returned/processed (%)</i>	1513	1.17	1.06	0.60	0.11	6.16
<i>returned</i>	1513	1.27	0.91	1.13	0.02	7.68
<i>processed</i>	1513	111.89	88.61	92.57	2.19	673.59
<i>\$ returned/# returned (\$ thousands)</i>	1513	0.872	0.758	0.37	0.347	2.830
<i>Unemployment Rate (%)</i>	2021	4.91	4.90	0.91	2.3	7.1
<i>Payday Permitted?</i>	2021	0.96	1	0.19	0	1

Table 13: More, and Smaller, Returned Checks when Deferred Deposit Loans are Not Permitted

Reported are OLS regression coefficients [robust standard errors] estimated with returned check data from Federal Reserve check processing centers (CPC) over 1998:Q1 - 2008:Q3. *Permitted* equals one if state permitted payday lending, zero if not. *Permitted* is identified by bans over sample in five states: GA, NC, MD, WV, and PA. Unemployment rate measured at Federal Reserve District level. All models include fixed effect for check processing center and date. Standard errors are clustered at CPC level.

	# Returned/# Processed (1.26 %)		Dependent variable (mean):		\$ Returned/# Returned (0.872 thousand)	
	(1)	(2)	\$ Returned/\$ Processed (1.17 %)		(5)	(6)
<i>Payday Permitted</i>	-0.429*** [0.16]	-0.398** [0.15]	-0.198 [0.13]	-0.196 [0.13]	0.123* [0.062]	0.134*** [0.041]
<i>Unemployment</i>	0.0416 [0.050]	0.0526 [0.048]	0.0221 [0.051]	0.0254 [0.051]	-0.0355 [0.024]	-0.0349* [0.018]
<i># Checks Processed</i>		-0.00341** [0.0014]				-0.00149** [0.00073]
<i>\$ Checks Processed</i>				-0.00138** [0.00055]		0.00171*** [0.00026]
<i>Constant</i>	1.193*** [0.26]	1.865*** [0.41]	0.960*** [0.26]	1.236*** [0.27]	0.750*** [0.12]	0.701*** [0.14]
Observations	1513	1513	1513	1513	1513	1513
R-squared	0.66	0.68	0.67	0.68	0.84	0.87

*** p<0.01, ** p<0.05, * p<0.1

APPENDIX A: PAYDAY LOAN REGULATIONS

States that Prohibited Payday Lending Throughout: NJ, NY, CT, MA.

New Jersey and New York forbid payday loans *via* check cashing laws that prohibit advancing money on post-dated checks (N.J. Stat. 17:15A-47 and NY CLS Bank 373) and usury limits (N.J. Stat. 2C:21-19 and NY CLS Penal 190.42). Massachusetts banned payday loans through a usury limit on small loans made or brokered in the state (ALM G.L.c.140 §96 and CMR 209 26.01).

Connecticut prohibited lending *via* a cap on check cashing fees (Conn. Agencies Reg. § 36a-585-1) and small loan interest rates (Conn. Gen. Stat. 36a-563). We confirmed by reading 10-K filings and company websites that the largest multistate payday store operators – Ace Cash Express, Advanced America, Cash America, Check into Cash, Check ‘N Go, Money Mart and Valued Services – operated no stores in these three states.

Changes in Regulations in States Bordering NJ, NY, CT, MA: NH, RI, PA

New Hampshire’s small loan interest rate cap acted as a *de facto* ban on payday loans until it was removed in January, 2000 (1999 NH ALS 248), and payday lenders entered thereafter. Staff Attorney of the Consumer Credit Division of the New Hampshire Department of Banking confirmed (*via* phone with author) that payday lenders did not operate in the state prior to 2000

Rhode Island’s small loan interest rate cap (R.I. Gen. Laws § 19-14.2-8) acted as a *de facto* prohibition on payday loans until a July 2001 law change that sanctioned deferred deposit transactions (R.I. P.L. 2001, Ch. 371, § 4). However, according to a regulatory supervisor in the Division of Banking, check cashers began offer deferred deposit on check cashing transactions in prior to the law change, in 2000.

Payday lending was ostensibly banned throughout the sample period in Pennsylvania via a cap on small loan interest rates (P.A. 7 P.S. § 6201-6219), but the agent model was permitted through a law that sanctioned loan brokering (P.A. 73 P.S. § 2181-2192). In practice, payday lenders did not build a presence until 1997. We can confirm that 95 percent of payday stores operating in 2006 were not operating in 1996.⁴¹

States where Payday Laws Changed Between 1995 and 2008

Eight states experienced a change in payday loan laws over the sample period. Seven transitioned from allowing to prohibiting payday loans: District of Columbia, Georgia, Maryland, North Carolina, Oregon, Pennsylvania and West Virginia transitioned from allowing to prohibiting payday lending over the sample period.

Maryland banned payday lending through restrictions on fees charged by check cashers (MD Financial Institutions Code § 12-120), restrictions on small loan interest rates (MD Commercial Law Code § 12-306), and finally passed anti-loan brokering legislation (MD Commercial Law Code § 14-1902), effective June, 2002 to eliminate the agency payday lending model. *PaydayAllowed* is coded as one for Maryland observations before 2002.

Georgia banned payday lending with a law that took effect in May, 2004 (O.C.G.A. § 16-17-1). Payday lenders finally exited North Carolina in December, 2005, and West Virginia in July, 2006 (add reference).

⁴¹ A predecessor of Advance America, National Cash Advance, entered the state in 1997 (Brickley 1999). Money Mart began its payday lending operation in earnest through an agent relationship in 1997 (See Office of the Comptroller of the Currency 1998). Check ‘N Go did not operate in the state before mid-1997 (Sekhri 1997). Ace Cash Express entered Pennsylvania in 2000 (Ace Cash Express, Inc. 2000). Finally, Cash Today began operations in mid-1999 (Matheson 2005), and Flexcheck Cash Advance began operations in mid-2001 (O’Donoghue 2003).